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UNITED STATES ARMY ENVIRONMENTAL HYGIENE AGENCY

ABERDEEN PROVING GROUND, MD 21010-5422

FINAL PHASE
THE EFFECTS OF LAUNDERING ON THE PERMETHRIN CONTENT OF IMPREGNATED MILITARY FABRICS
STUDY NO. 75-52-0687-88
APRIL 19[illegible] - MARCH 1988

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The insecticide permethrin, when impregnated into the military Battle Dress Uniform (BDU), is remarkably effective in repelling bites from disease-bearing insects. In practice, however, both wear and laundering will likely affect the insecticidal level within the BDU cloth and may alter the leaching rate of permethrin out of the fabric. To address these issues, both cotton and NYCO (50/50 nylon-cotton) BDU fabrics were impregnated with 14C-C14 labeled permethrin, then laundered 1 to 10 times. Permethrin loss was measured by chemical and by radiochemical analysis. Swatches (50 cm2) of each fabric, washed 1, 5, or 10 times, were affixed to the backs of rabbits and worn continuously for 7 days to quantitate permethrin migration to the skin. The results indicated that after 10 washings, permethrin loss measured 40 percent from cotton fabric and 55 percent from NYCO. The greatest loss (20-30 percent) occurred during the first wash. The rate of permethrin leaching from either type BDU cloth being worn by rabbits was unaffected by the number of launderings. In all cases, 3-4 percent of the impregnant reached the skin surface of rabbits through 7 days.

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DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO ATTENTION OF

HSHB-MO-T

12 OCT 1988

MEMORANDUM FOR: Executive Director, Armed Forces Pest Management Board, Forest Glen Section, WRAMC, Washington, DC 20307-5001

SUBJECT: Final Phase, The Effects of Laundering on the Permethrin Content of Impregnated Military Fabrics, Study No. 75-52-0687-88, April 1987 - March 1988

EXECUTIVE SUMMARY

The purpose and a summary of the pertinent findings of the enclosed report follow:

a. Purpose. To determine the effect of laundering on the permethrin content of impregnated military BDU's; and to measure the migration rate of permethrin from laundered BDU fabrics to the skin surface of rabbits during 1 week of continuous wear.

b. Findings. The laundering of military BDU fabrics impregnated with ^{14}C-labeled permethrin resulted in an impregnant loss of 40 percent from cotton and 55 percent from NYCO (50:50 nylon cotton blend) after ten washings. The greatest loss (20-30 percent) was noted after the first laundering. The rate of permethrin migration out of the cloth during one week of wear by rabbits was unaffected by the number of washings. About 3-4 percent of the impregnant reached the skin surface of rabbits over 7 days, regardless of fabric type or the number of launderings (1X, 5X, or 10X).

FOR THE COMMANDER:

Encl

Maurice H. Weeks

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Chief, Toxicology Division

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DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
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FINAL PHASE
THE EFFECTS OF LAUNDERING ON THE PERMETHRIN
CONTENT OF IMPREGNATED MILITARY FABRICS
STUDY NO. 75-52-0687-88
APRIL 1987 - MARCH 1988

1. AUTHORITY.

a. Memorandum of Understanding between the U.S. Army Environmental Hygiene Agency; the U.S. Army Health Services Command; the Department of the Army, Office of The Surgeon General; the Armed Forces Pest Management Board; and the U.S. Department of Agriculture, Agriculture Research, Science and Education Administration; titled Coordination of Biological and Toxicological Testing of Pesticides, effective 23 January 1979.

b. 1st Ind, HQDA(DASG-PSP), 1 May 1987, to letter, Armed Forces Pest Management Board, AFPMB, 27 April 1987, subject: Request for Laboratory Studies on Permethrin.

2. PURPOSE. To determine the effect of laundering on the permethrin content of treated military battle dress uniforms (BDU's); and to measure migration rates of permethrin from laundered BDU fabrics to the skin surface of rabbits during 1 week of continuous wear.

3. BACKGROUND. The Armed Forces Pest Management Board (AFPMB) has proposed the use of the insecticide permethrin as a clothing treatment against disease-bearing insects. Of interest to the military is the effect of laundering on permethrin-treated BDU's. Clearly, the efficacy of the material as an arthropod deterent would likely be affected. Of equal concern is how washing affects the rate of leaching of permethrin from treated BDU's to the skin surface of the wearer. The present study was designed to answer the latter question and to provide a basis for predicting human exposure during extended wear.

4. GENERAL. The basic experimental design of the study is as follows: Swatches of BDU fabrics were impregnated with permethrin (^{14}C-labeled) at the rate proposed for military use. Two types of fabric were tested: cotton and NYCO (50:50 nylon/cotton blend). Swatches of both fabrics were laundered one through 10 times using a standard military procedure. One-half of the swatches were then extracted in methanol and analyzed by liquid scintillation counting (LSC) and gas chromatography (GC) to determine permethrin loss. Remaining swatches, washed 1X, 5X or 10X, were

Use of trademarked names does not imply endorsement by the U.S. Army, but is intended only to assist in identification of a specific product.

applied to and worn by rabbits for 7 days. These were also analyzed for ^{14}C following wear. Migration of permethrin from the cloth during wear was considered that portion of the ^{14}C-label appearing in excreta (absorbed) plus that recovered from the skin surface (unabsorbed) at the end of 7 days.

Group	Animal Nos.	Fabric Type	Treatment Rate*	No. of Launderings	Exposure Period
A	43 - 48	Cotton	0.125 mg/cm^2	1X	7 Days
B	49 - 54	Cotton	0.125 mg/cm^2	5X	7 Days
C	55 - 60	Cotton	0.125 mg/cm^2	10X	7 Days
D	61 - 66	NYCO	0.125 mg/cm^2	1X	7 Days
E	67 - 72	NYCO	0.125 mg/cm^2	5X	7 Days
F	73 - 78	NYCO	0.125 mg/cm^2	10X	7 Days

* To each 50 cm^2 fabric swatch

5. ANIMALS.

a. Two groups of 18 male New Zealand White rabbits (2.25-2.75 kg) were obtained from Hazelton Research Products, Inc., Denver, Pennsylvania. Upon arrival, they were randomly assigned to individual metal metabolism cages and uniquely identified by ear tags.

b. Animals were quarantined for 2 weeks according to Toxicology Division SOP (No. 4) and acclimated to the room environment for 1 week prior to testing.

c. Food (Aberdeen-09 Certified Rabbit Ration, Ziegler Bros., Garners, Pennsylvania) and tap water were available ad libitum.

d. The study was conducted in an environmentally controlled room having a 12-hour light/dark cycle. Controls were set to maintain a temperature of 78.8 °F (±1.5°) and a relative humidity of 40 percent (±2 percent). This environment, considered "temperate," was used to relate data to earlier permethrin tests performed under the same climatic conditions (reference 10a).

6. MATERIALS AND METHODS.

a. Compounds.

(1) POUNCE® 3.2 EC. POUNCE is an agricultural insecticide marketed by the FMC Corporation, Philadelphia, Pennsylvania (EPA Reg No. 279-3014). It is provided as an emulsifiable concentrate containing 38.4 percent permethrin as the active ingredient (AI). The balance of the formulation is 50.2 percent xylene range aromatic solvent and 11.4 percent inert ingredients. The permethrin cis/trans isomer ratio was 40:60.

(2) ^{14}C-cis-permethrin. The ^{14}C-labeled cis-permethrin was obtained from DuPont-NEN, Boston, Massachusetts. It was radiolabeled in the benzyl methylene moiety and contained a specific activity of 57.1 mCi/mM.

(3) ^{14}C-trans-permethrin. The ^{14}C-labeled trans-permethrin was obtained from DuPont-NEN, Boston, MA. It was radiolabeled in the benzyl methylene moiety and contained a specific activity of 57.3 mCi/mM.

b. Materials.

(1) Cotton Fabric. Cotton (100 percent) BDU fabric was obtained from the U.S. Army Natick Research, Development and Engineering Center, Natick, Massachusetts. It is identified in military specification MIL-C-43469D as Type III; Woodland Camouflage Pattern.

(2) NYCO Fabric. The NYCO is a 50:50 nylon-cotton blend of BDU fabric and was obtained from Natick. It is identified in MIL-C-44031B as Class 1; Woodland Camouflage Pattern.

(3) Detergent. A standard U.S. Army laundry detergent was used. It was identified by label as: Soap-Type II, PD 245.

® POUNCE is a registered tradename of FMC Corporation, Philadelphia, Pennsylvania.

c. Fabric Treatment.

(1) Cotton and NYCO fabric was cut into 50 cm^2 swatches and weighed.

(2) Pounce 3.2 EC (38.4 percent permethrin) was diluted with distilled water. Radiolabeled (^{14}C) cis- and trans- permethrin isomers were then added such that the 40:60 cis-trans ratio of the cold permethrin was maintained. Two solutions were prepared in order that the treatment volume would represent 60 percent of the weight of each fabric type.

(3) Each 50 cm^2 swatch, cotton or NYCO, was treated by dispensing the solution (about 0.65 mL) drop-wise onto the fabric using an autopipette. Drops were uniformly spaced about the fabric which, following treatment, appeared wet due to the wicking effect of the fabric. Swatches were air dried in a hood for about 4 hours, then stored in a freezer until used. The nominal permethrin concentration in each 50 cm^2 swatch was:

	Cotton	NYCO
Permethrin Impregnation Rate	0.125 mg/cm^2	0.125 mg/cm^2
Total Weight Permethrin	6.24 mg	6.25 mg
Total ^{14}C	4.724 uCi	4.73 uCi

d. Laundering Procedure.

(1) The ^{14}C-permethrin-impregnated swatches, either cotton or NYCO, were laundered using a bench-top model which included a 4 liter glass beaker on top of an orbital shaker. The appropriate water/soap mixture was first added to the vessel, then the swatches added. Following agitation, the swatches were rung out by hand. Subsequent steps were performed in the same vessel. At the completion of each 5-step wash/rinse process (considered one laundering), random swatches were removed and air dried. They were placed in a freezer for later radiocarbon and chemical analyses. For testing in animals, random fabric sections laundered 1X, 5X, or 10X were retained. Each laundering procedure included the following steps:

Step 1. Fresh bath, 5 min at 140 °F with 1.18 percent soap (based upon weight of fabric).

Step 2. Fresh bath, 5 min at 125 °F with 0.59 percent soap.

Step 3. Fresh bath, 3 min at 110 °F - no soap.

Step 4. Fresh bath, 3 min at 100 °F - no soap.

Step 5. Fresh bath, 3 min at 100 °F - no soap.

(2) The laundered fabric swatches, cotton or NYCO, were extracted in methanol and analyzed by LSC for the ^{14}C label. The GC analyses of the same extracts were performed to measure permethrin (chemical) content. The cis-trans isomer ratios were also determined by GC to assure that laundering did not selectively remove one or the other isomers.

e. Animal Treatment.

(1) One day before application, the dorsal lumbar area of each rabbit's back was clipped free of hair. The area was examined the following day, just prior to application of the test fabric, to assure that no abrasions were present which would affect skin absorption.

(2) For application, each 50 cm^2 swatch was covered with a 4-ply gauze pad, then a slightly larger section of hardware screen. The edges of the screen were bound with adhesive tape to prevent abrasion of the rabbit's skin. The combination (fabric, gauze, and screen) was stapled together and taped to the clipped area of the rabbit's back. The tape covered only the edges of the screen, not the test fabric. The nonocclusive gauze/screen covering allowed normal convection but prevented surface loss of the test material from the fabric. Probing of the appliance by the rabbit was usually controlled by the screen covering. The fabric remained on the rabbits throughout the 7-day exposure period.

f. Specimen/Data Collection and Analyses.

(1) Individual animal weights were recorded prior to and at the termination of treatment.

(2) Urine was collected once daily through 7 days and the volumes measured. Aliquots were analyzed for ^{14}C by LSC.

(3) Feces were collected once daily and pooled for each animal. In toto weights were recorded following the last collection period and aqueous homogenates of each sample prepared. Aliquots of homogenates were extracted in methanol and analyzed by LSC.

(4) All rabbits were euthanized after the 7-day exposure period by an injection of T-61® Euthanasia Solution.

(5) At the termination of the test, the fabric swatch was removed, extracted in 50 mL of methanol and an aliquot analyzed for ^{14}C label by LSC. The bindings (gauze, screen and tape) were similarly analyzed. The skin from the application site (residing directly under the fabric) was excised, extracted in methanol and analyzed for radiocarbon remaining on (or in) the skin.

® T-61 is a registered tradename of Taylor Pharmaceutical Company, Decatur, Illinois.

(6) Computations of percent of dose recovery were based upon the available quantity of permethrin (as ^{14}C) remaining in the impregnated swatches after laundering.

7. RESULTS.

a. Effects of Laundering.

(1) Figure 1 indicates the results of laundering on the permethrin content of treated cotton or NYCO fabrics. The individual data are in Appendices A (cotton) and B (NYCO). The greatest permethrin loss, as measured by the ^{14}C label remaining in treated cloth, occurred after the first laundering. About 20 percent of the impregnant was lost from cotton fabric and 33 percent from the NYCO. An additional 6 percent was removed during the second laundering of either cotton or NYCO. After the second washing, a near steady-state loss of 2-3 percent per day occurred with each fabric type through the tenth and final laundering. After 10 washings, 40 percent of the impregnant had been lost from the cotton fabric and 55 percent from the NYCO.

(2) Results of the GC analyses (chemical) for permethrin content of the extract solutions were consistent with those obtained from LSC (^{14}C). Chemical analyses also indicated that the laundering process did not preferentially remove one or the other isomers. In all cases, the cis-trans isomer ratios measured 39:61, both before and after laundering.

b. Permethrin Migration from Laundered Cotton Fabric.

(1) Figure 2 depicts the appearance of ^{14}C-label in the urine of rabbits wearing ^{14}C-permethrin-treated cotton fabric. The test fabric was laundered either 1X, 5X, or 10X. The individual data appear in Appendix C. Maximum absorption of ^{14}C-label occurred within 48 hours and then slowly declined during the remaining 5 days of testing. Total ^{14}C appearing in the urine through 7 days measured 1.8 percent of the applied dose for fabric laundered 1X. For cloth laundered 5X or 10X, urinary ^{14}C measured 0.90 and 1.3 percent, respectively.

(2) Total ^{14}C recovery in rabbits wearing laundered cotton fabric for 7 days is presented in Table 1. Accountability ranged from 94 to 99 percent. In each case, radiocarbon recovered in feces measured 0.2 percent or less of the applied dose. Individual feces data are in Appendix D. About 2 percent of the impregnant remained on the skin surface after removal of the treated swatches 7 days post application. The ^{14}C extracted from the test fabric accounted for most of the total radiocarbon (83-90 percent) recovered. Permethrin migrating to the skin surface through 7 days was 3.9 percent of the applied dose for cotton fabric laundered 1X, as determined by radiocarbon appearing in excreta and that remaining on the skin after 7 days. For fabrics laundered 5X and 10X, migration was 3.1 percent and 2.6 percent, respectively. Appendix E contains the summary data.

Final Phase, The Effects of Laundering on the Permethrin Content of Impregnated Military Fabrics, Study No. 75-52-0687-88, Apr 87 - Mar 88

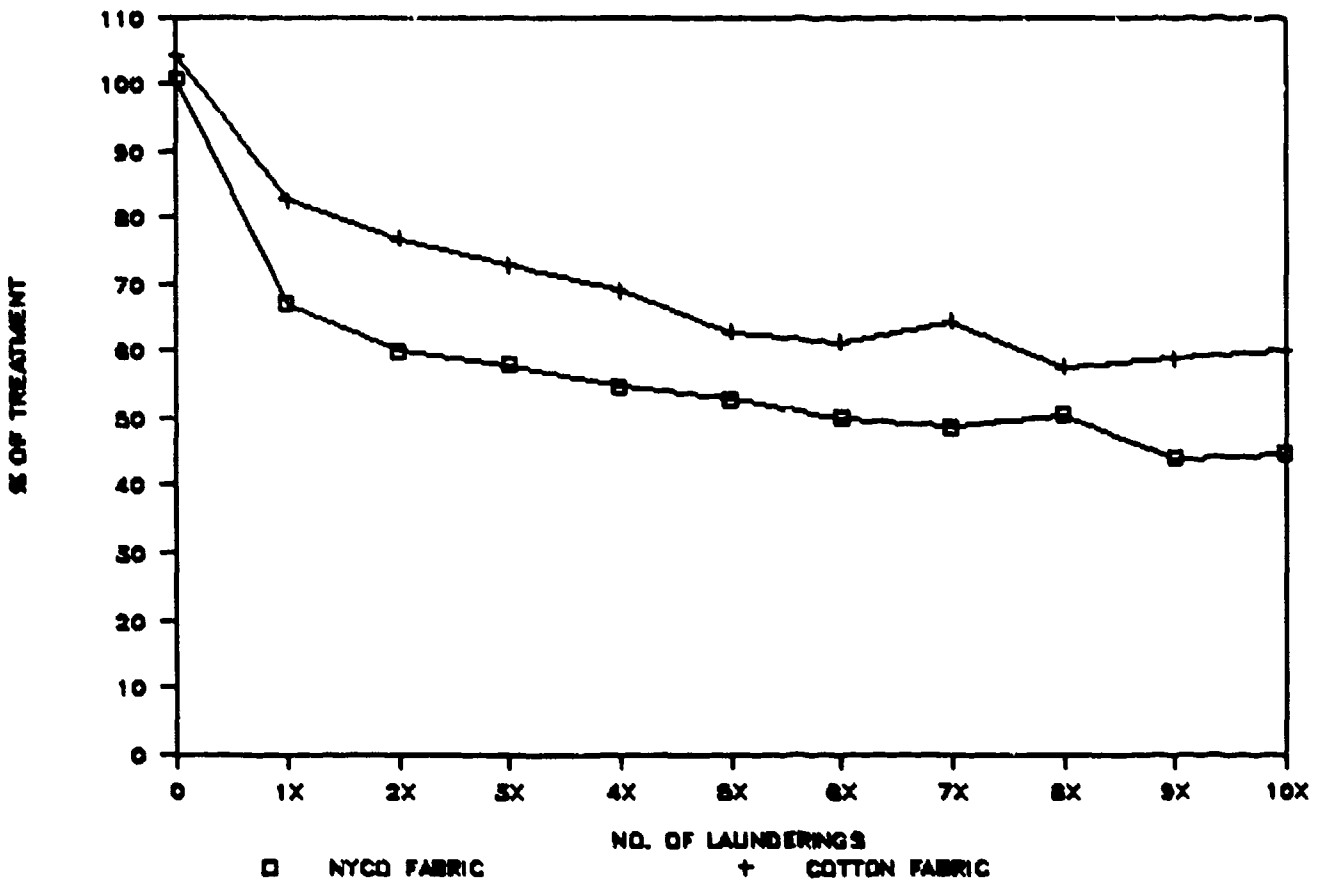

FIGURE 1. THE EFFECTS OF REPEATED LAUNDERING ON THE ^{14}C-PERMETHRIN CONTENT OF TREATED COTTON AND NYCO FABRICS.

Final Phase, The Effects of Laundering on the Permethrin Content of Impregnated Military Fabrics, Study No. 75-52-0687-88, Apr 87 - Mar 88

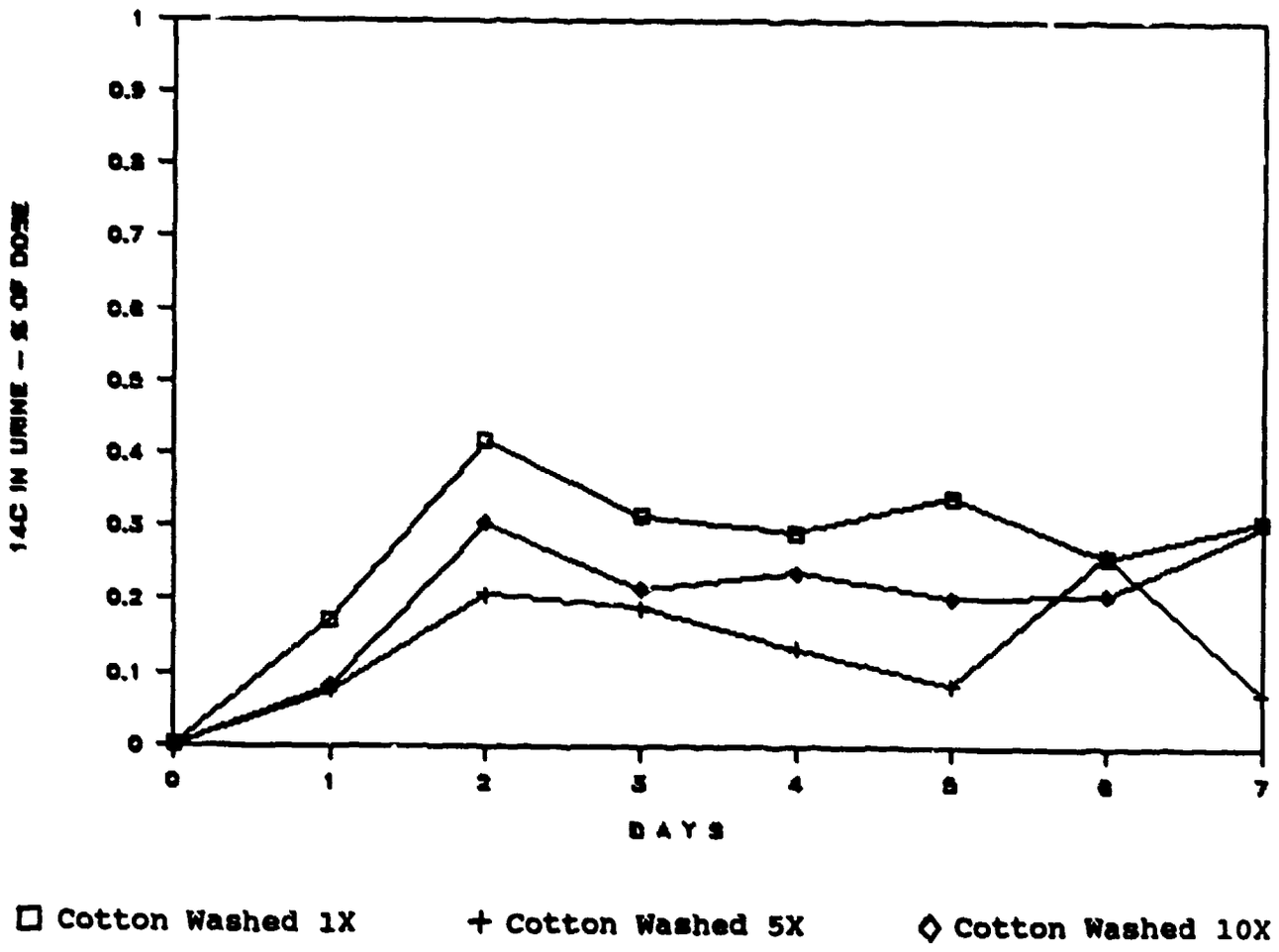

FIGURE 2 DAILY URINARY ^{14}C EXCRETION IN RABBITS WEARING LAUNDERED COTTON FABRIC TREATED WITH ^{14}C-PERMETHRIN.

TABLE 1. TOTAL ^{14}C RECOVERY (PERCENTAGE OF DOSE) IN RABBITS WEARING LAUNDERED, PERMETHRIN-TREATED,* COTTON FABRIC FOR 7 DAYS

Group	A	B	C
Rabbit Nos.	43 - 48	49 - 54	55 - 60
Fabric Type	Cotton	Cotton	Cotton
No. Launderings	1X	5X	10X
URINE	1.7598	0.9027	1.2668
FECES	0.0209	0.2041	0.0000
SKIN-APPL SITE	2.0722	1.9982	1.3711
TEST FABRIC	83.3223	90.0340	83.3520
BINDINGS	10.7174	6.2228	8.2339
TOTAL	97.8926	99.3618	94.2238
% MIGRA TO SKIN	3.8529	3.1050	2.6378

* 0.125 mg permethrin/cm^2 fabric X 50 cm^2.
SKIN-APPL SITE - Skin section from under the test fabric.
TEST FABRIC - ^{14}C remaining in test swatch after 7 days of wear.
BINDINGS - Tape binding including gauze and screen.
% MIGRA TO SKIN - Percent of ^{14}C recovered from excreta plus that remaining on the skin surface after 7 days.

c. Permethrin Migration from Laundered NYCO Fabric.

(1) Figure 3 shows the daily urinary excretion of ^{14}C-label in rabbits from the wear of laundered, permethrin-treated NYCO fabric. The ^{14}C excretion was generally highest after 48 hours of wear except for the 10X group (72 hours). The appearance of urinary ^{14}C then gradually decreased through the remainder of the test period. Cumulative ^{14}C appearing in urine through one week measured 1.2 to 1.3 percent of the applied dose, regardless of the number of launderings. Individual data appear in Appendix F.

Final Phase, The Effects of Laundering on the Permethrin Content of Impregnated Military Fabrics, Study No. 75-52-0687-88, Apr 87 - Mar 88

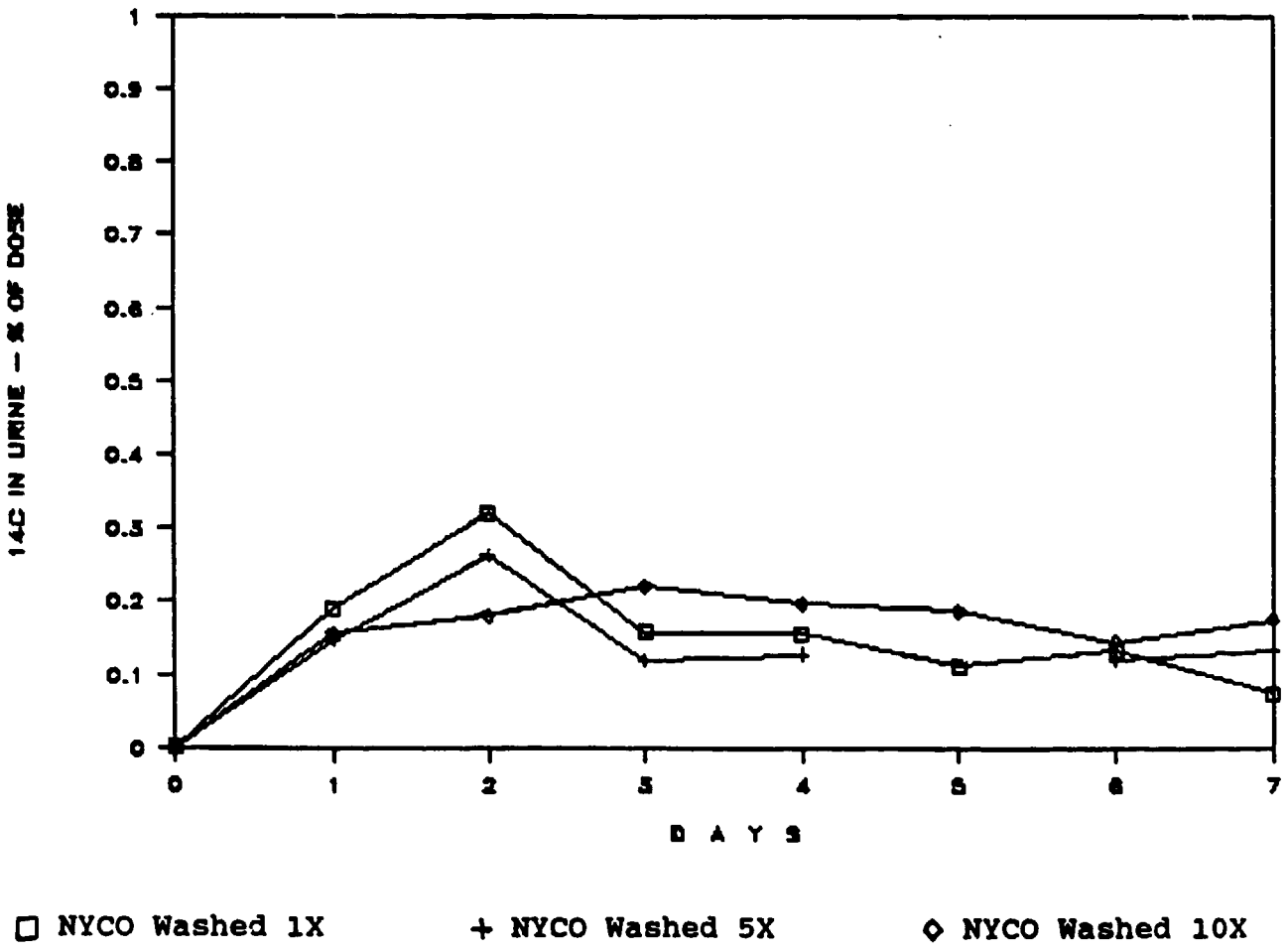

FIGURE 3. DAILY URINARY ^{14}C EXCRETION IN RABBITS WEARING LAUNDERED NYCO FABRIC TREATED WITH ^{14}C-PERMETHRIN.

(2) Pooled feces specimens from animals wearing laundered NYCO were essentially void of detectable radiocarbon (see Appendix G).

(3) Table 2 presents the total ^{14}C recovery in rabbits wearing laundered, permethrin-treated NYCO fabric for 1 week. The individual data are in Appendix H. Accountability (^{14}C) was 98 percent of the available dose in each case. Most of the radiocarbon (>82 percent) was extracted from the test swatches while 2-3 percent was recovered from the skin surface after 7 days. The ^{14}C migrating from laundered NYCO and reaching the skin of rabbits through one week, measured 3.1 percent (1X), 4.4 percent (5X) and 3.3 percent (10X) of the applied dose.

8. DISCUSSION.

a. It has been hypothesized that permethrin's persistence in cloth results from its binding capacity with cotton (cellulose) fibers (reference 10b). Once the fabric is impregnated, the chemical likely resides within the rigid cellulose coil and is dislodged only with organic solvents or under extreme physical conditions (reference 10b). Water (or sweat) has little demonstrated capacity to remove the impregnant from military fabrics (references 10a and 10c). Even with the high water temperatures (140 °F) and detergents used in the present test, only about one-half of the impregnant was removed after 10 launderings. This finding supports the cellulose-binding concept.

b. Permethrin loss as a function of the number of launderings did not markedly differ between the cotton and NYCO fabrics. Although the first laundering quantitatively removed more permethrin from NYCO fabric than from cotton, the remaining impregnant loss occurred at about the same rate for either cloth type during subsequent washings. The initial, greater permethrin loss from NYCO was not unexpected given the fabric's 50 percent nylon composition, e.g., once the unattached permethrin was removed (from nylon), the cotton-bound material would be lost at a slower rate. Other fabric materials containing cellulose, such as wool (50 percent), would be expected to bind/release permethrin in a similar fashion.

c. A comparison of results between the present test and earlier studies (reference 10a) indicates that unwashed fabrics, when worn by rabbits for 7 days, lose the permethrin impregnant at nearly the same rate as cloth laundered up to ten times. In both studies, only 3 to 4 percent of the impregnant migrated from cloth to the skin surface of rabbits during one week of continuous wear. Also noted in the earlier study was the absence of effects on permethrin migration despite varying environmental conditions (temperate and subtropical), simulated sweating (subtropical only) and different fabric types (cotton or NYCO).

TABLE 2. TOTAL ^{14}C RECOVERY (PERCENTAGE OF DOSE) IN RABBITS WEARING LAUNDERED, PERMETHRIN-TREATED,* NYCO FABRIC FOR 7 DAYS

Group	D	E	F
Rabbit Nos.	61 - 66	67 - 72	73 - 78
Fabric Type	NYCO	NYCO	NYCO
No. Launderings	1X	5X	10X
URINE	1.1821	1.2499	1.2744
FECES	0.0608	0.0000	0.0000
SKIN-APPL SITE	1.8303	3.1711	1.9905
TEST FABRIC	81.7784	83.8731	88.0958
BINDINGS	12.7436	9.5211	6.3458
TOTAL	97.5982	97.8152	97.7065
% MIGRA TO SKIN	3.0732	4.4210	3.2649

* 0.125 mg permethrin/cm^2 fabric X 50 cm^2.
SKIN-APPL SITE - Skin section from under the test fabric.
TEST FABRIC - ^{14}C remaining in test swatch after 7 days of wear.
BINDINGS - Tape binding including gauze and screen.
% MIGRA TO SKIN - Percent of ^{14}C recovered from excreta plus that remaining on the skin surface after 7 days.

9. CONCLUSIONS.

a. The laundering of military BDU fabrics impregnated with ^{14}C-labeled permethrin results in a total impregnant loss of 40 percent from cotton and 55 percent from NYCO after 10 launderings. The largest quantitative removal of impregnant (20-30 percent) occurs during the first wash, then a steady-state loss (2-3 percent per wash) generally prevails through the remaining nine washes.

b. The wearing of laundered BDU fabrics treated with permethrin results in a potential dermal exposure of 3-4 percent of the treatment dose through 7 days of wear. The fabric/skin migration rate of permethrin is not significantly affected by the fabric type (cotton - NYCO), climate (temperate or subtropical), the presence of sweat, or number of launderings (0 - 10X).

10. REFERENCES.

a. Memorandum, USAEHA, HSHB-MO-T, dated, 26 September 1988, subject: Phase 2, Migration of Permethrin from Military Fabrics Under Varying Environmental Conditions, Study No. 75-52-0687-88.

b. Personnel communication with Dr. Philip S. Magee, President/ Research Consultant, BIOSAR Research Project, Vallejo, CA 94591.

c. Schreck, C. E., K. Posey and D. Smith, "Durability of Permethrin as a Potential Clothing Treatment to Protect Against Blood-feeding Arthropods," J. of Econ. Entomol., Vol. 71, No. 3, 397-400 (1978).

d. Memorandum, USAEHA, HSHB-MO-T, dated 12 April 1988, subject; Phase 1, Fabric/Skin Contact from Wearing the Army Battle Dress Uniform, Study No. 75-52-0687-88.

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Final Phase, The Effects of Laundering on the Permethrin Content of Impregnated Military Fabrics, Study No. 75-52-0687-88, Apr 87 - Mar 88

APPENDIX A

EFFECTS OF LAUNDERING ON THE PERMETHRIN CONTENT OF IMPREGNATED COTTON FABRIC

FABRIC: COTTON (50 cm2 SWATCH) RADIOCARBON CONTENT-uCi 4.724
TEST: LAUNDERING 0 TO 10X PERMETHRIN CONTENT-mg 6.24

NO. OF WASHES	#	DPM/ML	EXTRACT VOL (ML)	TOTAL uCi	PERCENT RECOVERY	% PERMETH LOSS
Unwashed	A	215681	50	4.8577	102.8298	0.0000
	B	220503	50	4.9663	105.1288	0.0000
	C	220898	50	4.9752	105.3171	0.0000
	D	218825	50	4.9285	104.3288	0.0000
	E	220689	50	4.9705	105.2175	0.0000
	F	216837	50	4.8837	103.3810	0.0000
	MEAN			4.9303	104.3671	
	S.D.			0.0454	0.9612	
WASH 1X	A	157854	50	3.5553	75.2597	24.7403
	B	173770	50	3.9137	82.8480	17.1520
	C	180654	50	4.0688	86.1301	13.8699
	D	172842	50	3.8928	82.4055	17.5945
	E	175349	50	3.9493	83.6008	16.3992
	F	180732	50	4.0705	86.1672	13.8328
	MEAN			3.9084	82.7352	17.2648
	S.D.			0.1726	3.6528	3.6528
WASH 2X	A	155254	50	3.4967	74.0201	25.9799
	B	167513	50	3.7728	79.8648	20.1352
	MEAN			3.6348	76.9425	23.0575
	S.D.			0.1381	2.9223	2.9223
WASH 3X	A	147539	50	3.3230	70.3419	29.6581
	B	158068	50	3.5601	75.3618	24.6382
	MEAN			3.4415	72.8518	27.1482
	S.D.			0.1186	2.5099	2.5099
WASH 4X	A	141505	50	3.1870	67.4651	32.5349
	B	148443	50	3.3433	70.7729	29.2271
	MEAN			3.2652	69.1190	30.8810
	S.D.			0.0781	1.6539	1.6539

APPENDIX A

EFFECTS OF LAUNDERING ON THE PERMETHRIN CONTENT OF IMPREGNATED COTTON FABRIC

NO. OF WASHES	#	DPM/ML	EXTRACT VOL (ML)	TOTAL uCi	PERCENT RECOVERY	% PERMETH LOSS
5X	A	113603	50	2.5586	54.0479	45.9521
	B	134615	50	3.0319	64.0446	35.9554
	C	144463	50	3.2537	68.7299	31.2701
	D	131425	50	2.9600	62.5269	37.4731
	E	129591	50	2.9187	61.6543	38.3457
	F	140161	50	3.1568	66.6831	33.3169
	MEAN			2.9799	62.9478	37.0522
	S.D.			0.2201	4.6484	4.6484
6X	A	129545	50	2.9177	61.6324	38.3676
	B	129016	50	2.9058	61.3808	38.6192
	MEAN			2.9117	61.5066	38.4934
	S.D.			0.0060	0.1258	0.1258
7X	A	142370	50	3.2065	67.7341	32.2659
	B	128468	50	2.8934	61.1201	38.8799
	MEAN			3.0500	64.4271	35.5729
	S.D.			0.1566	3.3070	3.3070
8X	A	126263	50	2.8438	60.0710	39.9290
	B	116146	50	2.6159	55.2577	44.7423
	MEAN			2.7298	57.6644	42.3356
	S.D.			0.1139	2.4066	2.4066
9X	A	124455	50	2.8030	59.2108	40.7892
	B	123453	50	2.7805	58.7341	41.2659
	MEAN			2.7918	58.9725	41.0275
	S.D.			0.0113	0.2384	0.2384
10X	A	126488	50	2.8488	60.1780	39.8220
	B	127523	50	2.8721	60.6705	39.3295
	C	133135	50	2.9985	63.3404	36.6596
	D	124737	50	2.8094	59.3450	40.6550
	E	126598	50	2.8513	60.2304	39.7696
	F	122186	50	2.7519	58.1313	41.8687
	MEAN			2.8554	60.3159	39.6841
	S.D.			0.0749	1.5819	1.5819

APPENDIX B

EFFECTS OF LAUNDERING ON THE PERMETHRIN CONTENT OF IMPREGNATED NYCO FABRIC

FABRIC: NYCO (50 cm2 SWATCH) RADIOCARBON CONTENT-uCi 4.73
TEST: LAUNDERING 0 TO 10X PERMETHRIN CONTENT-mg 6.25

NO. OF WASHES	#	DPM/ML	EXTRACT VOL (ML)	TOTAL uCi	PERCENT RECOVERY	% PERMETH LOSS
Unwashed	A	210096	50	4.7319	100.0400	0.0000
	B	209087	50	4.7092	99.5595	0.0000
	C	213978	50	4.8193	101.8885	0.0000
	D	212296	50	4.7814	101.0876	0.0000
	E	213980	50	4.8194	101.8894	0.0000
	F	211818	50	4.7707	100.8600	0.0000
	MEAN			4.7720	100.8875	
	S.D.			0.0411	0.8687	
WASH 1X	A	134414	50	3.0273	64.0030	35.9970
	B	143173	50	3.2246	68.1737	31.8263
	C	143139	50	3.2239	68.1575	31.8425
	D	144770	50	3.2606	68.9342	31.0658
	E	135009	50	3.0407	64.2863	35.7137
	F	143637	50	3.2351	68.3947	31.6053
	MEAN			3.1687	66.9916	33.0084
	S.D.			0.0961	2.0310	2.0310
WASH 2X	A	133613	50	3.0093	63.6216	36.3784
	B	118893	50	2.6778	56.6125	43.3875
	MEAN			2.8435	60.1170	39.8830
	S.D.			0.1658	3.5046	3.5046
WASH 3X	A	116244	50	2.6181	55.3511	44.6489
	B	127590	50	2.8736	60.7537	39.2463
	MEAN			2.7459	58.0524	41.9476
	S.D.			0.1278	2.7013	2.7013
WASH 4X	A	113043	50	2.5460	53.8269	46.1731
	B	116831	50	2.6313	55.6306	44.3694
	MEAN			2.5887	54.7288	45.2712
	S.D.			0.0427	0.9019	0.9019

APPENDIX B

EFFECTS OF LAUNDERING ON THE PERMETHRIN CONTENT OF IMPREGNATED NYCO FABRIC (CON'T)

NO. OF WASHES	#	DPM/ML	EXTRACT VOL (ML)	TOTAL uCi	PERCENT RECOVERY	% PERMETH LOSS
5X	A	111356	50	2.5080	53.0236	46.9764
	B	114165	50	2.5713	54.3612	45.6388
	C	118896	50	2.6778	56.6139	43.3861
	D	108160	50	2.4360	51.5018	48.4982
	E	110915	50	2.4981	52.8136	47.1864
	F	104214	50	2.3472	49.6229	50.3771
	MEAN			2.5064	52.9895	47.0105
	S.D.			0.1033	2.1832	2.1832
6X	A	112189	50	2.5268	53.4203	46.5797
	B	98076	50	2.2089	46.7002	53.2998
	MEAN			2.3678	50.0602	49.9398
	S.D.			0.1589	3.3600	3.3600
7X	A	102819	50	2.3157	48.9586	51.0414
	B	101877	50	2.2945	48.5101	51.4899
	MEAN			2.3051	48.7344	51.2656
	S.D.			0.0106	0.2243	0.2243
8X	A	106761	50	2.4045	50.8357	49.1643
	B	105680	50	2.3802	50.3209	49.6791
	MEAN			2.3924	50.5783	49.4217
	S.D.			0.0122	0.2574	0.2574
9X	A	91409	50	2.0588	43.5256	56.4744
	B	93869	50	2.1142	44.6970	55.3030
	MEAN			2.0865	44.1113	55.8887
	S.D.			0.0277	0.5857	0.5857
10X	A	92015	50	2.0724	43.8142	56.1858
	B	101526	50	2.2866	48.3430	51.6570
	C	93981	50	2.1167	44.7503	55.2497
	D	97004	50	2.1848	46.1897	53.8103
	E	90716	50	2.0432	43.1956	56.8044
	F	90688	50	2.0425	43.1823	56.8177
	MEAN			2.1244	44.9125	55.0875
	S.D.			0.0876	1.8517	1.8517

APPENDIX C

URINARY EXCRETION OF 14C IN RABBITS WEARING 14C-PERMETHRIN-TREATED COTTON FABRIC LAUNDERED 1X.

FABRIC: COTTON (50 cm2); LAUNDERED 1X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 3.91
PERMETHRIN CONTENT-mg 5.17
mg/uCi 1.3225

ANIMAL NO.		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	TOTAL
43	DPM/ML	127	163	235	396	230	230	1096 *	
	URINE VOL	226	340	130	174	180	150	130	
	TOTAL uCi	0.0129	0.0250	0.0138	0.0310	0.0186	0.0155	0.0642	
	TOTAL MG	0.0171	0.0330	0.0182	0.0410	0.0247	0.0206	0.0849	
	% RECOVERY	0.3307	0.6385	0.3520	0.7938	0.4769	0.3975	1.6414	4.6307 *
44	DPM/ML	56	342	65	56	68	37	84	
	URINE VOL	92	94	60	70	96	66	74	
	TOTAL uCi	0.0023	0.0145	0.0018	0.0018	0.0029	0.0011	0.0028	
	TOTAL MG	0.0031	0.0192	0.0023	0.0023	0.0039	0.0015	0.0037	
	% RECOVERY	0.0594	0.3704	0.0449	0.0452	0.0752	0.0281	0.0716	0.6948
45	DPM/ML	138	340	352	67	450 *	486 *	481 *	
	URINE VOL	66	164	130	174	158	110	162	
	TOTAL uCi	0.0041	0.0251	0.0206	0.0053	0.0320	0.0241	0.0351	
	TOTAL MG	0.0054	0.0332	0.0273	0.0069	0.0424	0.0318	0.0464	
	% RECOVERY	0.1049	0.6424	0.5272	0.1343	0.8191	0.6159	0.8977	3.7415 *
46	DPM/ML	269	248	222	210	195	263	196	
	URINE VOL	94	168	208	186	196	100	184	
	TOTAL uCi	0.0114	0.0188	0.0208	0.0176	0.0172	0.0118	0.0162	
	TOTAL MG	0.0151	0.0248	0.0275	0.0233	0.0228	0.0157	0.0215	
	% RECOVERY	0.2913	0.4800	0.5320	0.4500	0.4403	0.3030	0.4155	2.9120
47	DPM/ML	67	113	159		298	190	394	
	URINE VOL	198	180	162	90	178	212	150	
	TOTAL uCi	0.0060	0.0092	0.0116	0.0087	0.0239	0.0181	0.0266	
	TOTAL MG	0.0079	0.0121	0.0153	0.0115	0.0316	0.0240	0.0352	
	% RECOVERY	0.1528	0.2343	0.2967	0.2229	0.6111	0.4640	0.6809	2.6628
48	DPM/ML	51	83	84	73	67	69	54	
	URINE VOL	168	150	138	130	130	138	120	
	TOTAL uCi	0.0039	0.0056	0.0052	0.0043	0.0039	0.0043	0.0029	
	TOTAL MG	0.0051	0.0074	0.0069	0.0057	0.0052	0.0057	0.0039	
	% RECOVERY	0.0987	0.1434	0.1335	0.1093	0.1003	0.1097	0.0747	0.7697
MEAN % RECOVERY		0.1730	0.4182	0.3144	0.2926	0.3408	0.2605	0.3106	1.7598
STNDRD DEVIATION		0.1019	0.1889	0.1824	0.2584	0.2144	0.1666	0.2554	1.0317

* Value omitted in computation of MEAN % RECOVERY. Elevated value caused by animal ingesting a portion of the test swatch.

APPENDIX C

URINARY EXCRETION OF 14C IN RABBITS WEARING 14C-PERMETHRIN-TREATED COTTON FABRIC LAUNDERED 5X.

FABRIC: COTTON (50 cm2); LAUNDERED 5X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 2.97
PERMETHRIN CONTENT-mg 3.93
mg/uCi 1.3232

ANIMAL NO.		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	TOTAL
49	DPM/ML	0	50	57	0	57	188	0	
	URINE VOL	162	250	132	100	80	88	128	
	TOTAL uCi	0.0000	0.0056	0.0034	0.0000	0.0021	0.0075	0.0000	
	TOTAL MG	0.0000	0.0075	0.0045	0.0000	0.0027	0.0099	0.0000	
	% RECOVERY	0.0000	0.1896	0.1141	0.0000	0.0692	0.2509	0.0000	0.6238
50	DPM/ML	88	62	356 *	1692 *	351	244	82	
	URINE VOL	10	110	170	96	40	90	100	
	TOTAL uCi	0.0004	0.0031	0.0273	0.0732	0.0063	0.0099	0.0037	
	TOTAL MG	0.0005	0.0041	0.0361	0.0968	0.0084	0.0131	0.0049	
	% RECOVERY	0.0133	0.1034	0.9179	2.4636	0.2129	0.3331	0.1244	4.1686 *
51	DPM/ML	65	193	121	476 *	416 *	161	5189 *	
	URINE VOL	148	114	158	126	68	162	78	
	TOTAL uCi	0.0043	0.0099	0.0086	0.0270	0.0127	0.0117	0.1823	
	TOTAL MG	0.0057	0.0131	0.0114	0.0357	0.0169	0.0155	0.2412	
	% RECOVERY	0.1459	0.3337	0.2900	0.9096	0.4290	0.3956	6.1386	8.6424 *
52	DPM/ML	44	70	140	56	44	0	41	
	URINE VOL	244	140	168	82	76	54	64	
	TOTAL uCi	0.0048	0.0044	0.0106	0.0021	0.0015	0.0000	0.0012	
	TOTAL MG	0.0064	0.0058	0.0140	0.0027	0.0020	0.0000	0.0016	
	% RECOVERY	0.1628	0.1486	0.3567	0.0696	0.0507	0.0000	0.0398	0.8283
53	DPM/ML		98	0	203		202	136	
	URINE VOL	0	210	12	108	0	150	78	
	TOTAL uCi	0.0000	0.0093	0.0000	0.0099	0.0000	0.0136	0.0048	
	TOTAL MG	0.0000	0.0123	0.0000	0.0131	0.0000	0.0181	0.0063	
	% RECOVERY	0.0000	0.3121	0.0000	0.3325	0.0000	0.4596	0.1609	1.2651
54	DPM/ML	74	115	890 *	829 *	166 *	51	41	
	URINE VOL	112	90	154	154	70	186	70	
	TOTAL uCi	0.0037	0.0047	0.0617	0.0575	0.0052	0.0043	0.0013	
	TOTAL MG	0.0049	0.0062	0.0817	0.0761	0.0069	0.0057	0.0017	
	% RECOVERY	0.1257	0.1570	2.0787	1.9363	0.1762	0.1439	0.0435	4.6613 *
MEAN % RECOVERY		0.0746	0.2074	0.1902	0.1341	0.0832	0.2638	0.0737	0.9057
STNDRD DEVIATION		0.0711	0.0857	0.1411	0.1432	0.0791	0.1553	2.2609	0.2615

* Value omitted in computation of MEAN % RECOVERY. Elevated value caused by animal ingesting a portion of the test swatch.

APPENDIX C

URINARY EXCRETION OF 14C IN RABBITS WEARING 14C-PERMETHRIN-TREATED COTTON FABRIC LAUNDERED 10X.

FABRIC: COTTON (50 cm2); LAUNDERED 10X — RADIOCARBON CONTENT-uCi 2.85
ENVIRONMENTAL CONDITIONS: TEMPERATE — PERMETHRIN CONTENT-mg 3.76
TEST LENGTH: 7 DAYS — mg/uCi 1.3193

ANIMAL NO.		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	TOTAL
55	DPM/ML	0	46	0	0	0	71	84	
	URINE VOL	130	182	170	198	96	116	156	
	TOTAL uCi	0.0000	0.0038	0.0000	0.0000	0.0000	0.0037	0.0059	
	TOTAL MG	0.0000	0.0050	0.0000	0.0000	0.0000	0.0049	0.0078	
	% RECOVERY	0.0000	0.1323	0.0000	0.0000	0.0000	0.1302	0.2071	0.4696
56	DPM/ML	64	208	191	241	49	258 *	613 *	
	URINE VOL	154	168	200	174	174	176	116	
	TOTAL uCi	0.0044	0.0157	0.0172	0.0189	0.0038	0.0205	0.0320	
	TOTAL MG	0.0059	0.0208	0.0227	0.0249	0.0051	0.0270	0.0423	
	% RECOVERY	0.1558	0.5523	0.6038	0.6628	0.1348	0.7177	1.1239	3.9509 *
57	DPM/ML	0	68	73	109	140	136	313	
	URINE VOL	208	206	188	180	158	144	148	
	TOTAL uCi	0.0000	0.0063	0.0062	0.0088	0.0100	0.0088	0.0209	
	TOTAL MG	0.0000	0.0083	0.0082	0.0117	0.0131	0.0116	0.0275	
	% RECOVERY	0.0000	0.2214	0.2169	0.3101	0.3496	0.3095	0.7322	2.1397
58	DPM/ML	49	59	74	67	279 *	77	89	
	URINE VOL	182	215	218	206	198	220	196	
	TOTAL uCi	0.0040	0.0057	0.0073	0.0062	0.0249	0.0076	0.0079	
	TOTAL MG	0.0053	0.0075	0.0096	0.0082	0.0328	0.0101	0.0104	
	% RECOVERY	0.1410	0.2005	0.2550	0.2181	0.8731	0.2677	0.2757	2.2311 *
59	DPM/ML	0	49	0	0	0	45	0	
	URINE VOL	130	152	222	256	120	178	94	
	TOTAL uCi	0.0000	0.0034	0.0000	0.0000	0.0000	0.0036	0.0000	
	TOTAL MG	0.0000	0.0044	0.0000	0.0000	0.0000	0.0048	0.0000	
	% RECOVERY	0.0000	0.1177	0.0000	0.0000	0.0000	0.1266	0.0000	0.2443
60	DPM/ML	65	173	255 *	264 *	227	297 *	319 *	
	URINE VOL	190	220	132	140	148	[illegible]	130	
	TOTAL uCi	0.0056	0.0171	0.0152	0.0166	0.0151	0.0192	0.0187	
	TOTAL MG	0.0073	0.0226	0.0200	0.0220	0.0200	0.0254	0.0246	
	% RECOVERY	0.1952	0.6015	0.5320	0.5842	0.5310	0.6743	0.6554	3.7736 *
MEAN % RECOVERY		0.0820	0.3043	0.2151	0.2382	0.2031	0.2085	0.3037	0.9512
STNDRD DEVIATION		0.0836	0.1966	0.2214	0.2447	0.2079	0.0815	0.2674	0.8454

* Value omitted in computation of MEAN % RECOVERY. Elevated value caused by animal ingesting a portion of the test swatch.

APPENDIX D

14C PERMETHRIN APPEARING IN RABBIT FECES THROUGH 7 DAYS FOLLOWING WEAR OF LAUNDERED COTTON FABRIC.

14C CONTENT IN 50 cm2 OF COTTON FABRIC (uCi)	4.724	PERMETHRIN CONTENT (mg):	6.24
AFTER LAUNDERING 1X:	3.91	AFTER LAUNDERING 1X:	5.17
AFTER LAUNDERING 5X:	2.97	AFTER LAUNDERING 5X:	3.93
AFTER LAUNDERING 10X:	2.85	AFTER LAUNDERING 10X:	3.76

GROUP	ANIMAL NO.	FECES GM-WGHT	WATER ADDED-GM	TOTAL WGHT	ALIQUOT GM	METHANOL ADDED-ML	DPM/ML	TOTAL uCi	TOTAL % RECOV
COTTON	43A	721	700	1421	15	8	<LLD	0.0000	0.0000
WASH 1X	43B	494	500	994	9	8	12.3	0.0049	0.1252
	44A	637	600	1237	9	8	<LLD	0.0000	0.0000
	44B	346	300	646	6	8	<LLD	0.0000	0.0000
	45A	425	400	825	9	8	<LLD	0.0000	0.0000
	45B	372	400	772	7	8	<LLD	0.0000	0.0000
	46A	468	500	968	9	8	<LLD	0.0000	0.0000
	46B	440	400	840	13	8	<LLD	0.0000	0.0000
	47A	470	500	970	8	8	<LLD	0.0000	0.0000
	47B	352	300	652	7	8	<LLD	0.0000	0.0000
	48A	641	641	1282	9	8	<LLD	0.0000	0.0000
	48B	369	400	769	8	8	<LLD	0.0000	0.0000
COTTON	49A	451	451	902	5	8	<LLD	0.0000	0.0000
WASH 5X	49B	375	375	750	4	8	15.95	0.0108	0.3629
	50A	379	379	758	8	8	17.65	0.0060	0.2029
	50B	284	284	568	5	8	<LLD	0.0000	0.0000
	51A	504	504	1008	4	8	<LLD	0.0000	0.0000
	51B	132	132	264	9	8	<LLD	0.0000	0.0000
	52A	470	470	940	4	8	<LLD	0.0000	0.0000
	52B	226	226	452	7	8	<LLD	0.0000	0.0000
	53A	52	52	104	7	8	<LLD	0.0000	0.0000
	53B	305	305	610	7	8	<LLD	0.0000	0.0000
	54A	497	497	994	5	8	27.3	0.0196	0.6585
	54B	228	228	456	4	8	<LLD	0.0000	0.0000
COTTON	55A	648	648	1296	6	8	<LLD	0.0000	0.0000
WASH 10X	55B	380	380	760	5	8	<LLD	0.0000	0.0000
	56A	701	701	1402	5	8	<LLD	0.0000	0.0000
	56B	378	378	756	4	8	<LLD	0.0000	0.0000
	57A	392	392	784	4	8	<LLD	0.0000	0.0000
	57B	320	320	640	5	8	<LLD	0.0000	0.0000
	58A	636	636	1272	7	8	<LLD	0.0000	0.0000
	58B	381	381	762	4	8	<LLD	0.0000	0.0000
	59A	455	455	910	4	8	<LLD	0.0000	0.0000
	59B	347	347	694	5	8	<LLD	0.0000	0.0000
	60A	506	506	1012	5	8	<LLD	0.0000	0.0000
	60B	450	450	900	4	8	<LLD	0.0000	0.0000

Feces volumes were divided for analysis, hence, the A and B designation.

<LLD - Equal to or less than the Lower Limit of Detectability.

APPENDIX E

TOTAL 14C RECOVERY IN RABBITS WEARING 14C-PERMETHRIN-TREATED COTTON FABRIC LAUNDERED 1X.

FABRIC: COTTON (50 cm2 SWATCH); LAUNDERED 1X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 3.91
PERMETHRIN CONTENT-mg 5.17
mg/uCi 1.3225

ANIMAL NO.		URINE	FECES	SKIN-APP SITE	TEST FABRIC	BINDINGS	% MIGRA TO SKIN*	TOTAL % RECOVERY
43	DPM/ML			750	151750	13740		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0169	3.4178	0.3095		
	TOTAL MG			0.0223	4.5200	0.4093		
	% OF APPL	(4.6307)	0.1252	0.4320	87.4116	7.9146		100.5141
44	DPM/ML			4455	156350	21395		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.1003	3.5214	0.4819		
	TOTAL MG			0.1327	4.6570	0.6373		
	% OF APPL	0.6948	0.0000	2.5662	90.0613	12.3240	3.2610	105.6463
45	DPM/ML			3210	140865	19690		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0723	3.1726	0.4435		
	TOTAL MG			0.0956	4.1958	0.5865		
	% OF APPL	(3.7415)	0.0000	1.8490	81.1416	11.3419		98.0740
46	DPM/ML			2380	145900	15675		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0536	3.2860	0.3530		
	TOTAL MG			0.0709	4.3458	0.4669		
	% OF APPL	2.9120	0.0000	1.3709	84.0418	9.0292	4.2829	97.3539
47	DPM/ML			6120	142375	20010		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.1378	3.2066	0.4507		
	TOTAL MG			0.1823	4.2408	0.5960		
	% OF APPL	2.6628	0.0000	3.5253	82.0114	11.5262	6.1881	99.7257
48	DPM/ML			4670	130665	21125		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.1052	2.9429	0.4758		
	TOTAL MG			0.1391	3.8920	0.6292		
	% OF APPL	0.7697	0.0000	2.6900	75.2661	12.1685	3.4597	90.8944
MEAN % RECOVERY		1.7598	0.0209	2.0722	83.3223	10.7174	4.2979	98.7014
STND DEVIATION		1.0317	0.0467	0.9974	4.7263	1.6552	1.1566	4.3918

* Total 14C appearing in excreta plus that remaining on the skin surface at test end. Values in parentheses used only for accountability (TOTAL % RECOVERY). See Appendix F for explanation.

APPENDIX E

TOTAL 14C RECOVERY IN RABBITS WEARING 14C-PERMETHRIN-TREATED COTTON FABRIC LAUNDERED 5X

FABRIC: COTTON (50 cm2 SWATCH); LAUNDERED 5X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 2.97
PERMETHRIN CONTENT-mg 3.93
mg/uCi 1.3232

ANIMAL NO.		URINE	FECES	SKIN-APP SITE	TEST FABRIC	BINDINGS	% MIGRA TO SKIN*	TOTAL % RECOVERY
49	DPM/ML			3845	116450	8470		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0866	2.6273	0.1908		
	TOTAL MG			0.1146	3.4764	0.2524		
	% OF APPL	0.6217	0.3629	2.9158	88.4397	6.4231	3.9004	98.7832
50	DPM/ML			2795	126485	10045		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0630	2.8488	0.2262		
	TOTAL MG			0.0833	3.7695	0.2994		
	% OF APPL	(4.1546)	0.2029	2.1195	95.9179	7.6175		109.8095
51	DPM/ML			720	112875	4950		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0162	2.5422	0.1115		
	TOTAL MG			0.0215	3.3639	0.1475		
	% OF APPL	(8.6134)	0.0000	0.5460	85.5970	3.7538		98.6001
52	DPM/ML			2215	132990	6875		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0499	2.9953	0.1548		
	TOTAL MG			0.0660	3.9633	0.2049		
	% OF APPL	0.8256	0.0000	1.6797	100.8509	5.2135	2.5053	108.5697
53	DPM/ML			4430	119515	12690		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0998	2.6918	0.2858		
	TOTAL MG			0.1320	3.5618	0.3782		
	% OF APPL	1.2608	0.0000	3.3594	90.6323	9.6233	4.6202	104.8758
54	DPM/ML			1805	119665	6205		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0407	2.6952	0.1398		
	TOTAL MG			0.0538	3.5662	0.1849		
	% OF APPL	(4.6457)	0.6585	1.3688	90.7460	4.7055		101.4760
MEAN % RECOVERY		0.9027	0.2041	1.9982	92.0340	6.2228	3.6753	103.6857
STND DEVIATION		0.2665	0.2438	0.9413	5.0109	1.9564	0.8780	4.4263

* Total 14C appearing in excreta plus that remaining on the skin surface at test end. Values in parentheses used only for accountability (TOTAL % RECOVERY). See Appendix C for explanation.

APPENDIX E

TOTAL 14C RECOVERY IN RABBITS WEARING 14C-PERMETHRIN-TREATED COTTON FABRIC LAUNDERED 10X.

FABRIC: COTTON (50 cm2 SWATCH); LAUNDERED 10X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi	2.85
PERMETHRIN CONTENT-mg	3.76
mg/mCi	1.3193

ANIMAL NO.		URINE	FECES	SKIN-APP SITE	TEST FABRIC	BINDINGS	% MIGRA TO SKIN*	TOTAL % RECOVERY
55	DPM/ML			345	100505	10550		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0078	2.2636	0.2376		
	TOTAL MG			0.0103	2.9864	0.3135		
	% OF APPL	0.4680	0.0000	0.2726	79.4255	8.3373	0.7406	88.5034
56	DPM/ML			380	105845	9410		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0086	2.3839	0.2119		
	TOTAL MG			0.0113	3.1451	0.2796		
	% OF APPL	(3.9371)	0.0000	0.3003	83.6455	7.4364		95.3193
57	DPM/ML			1345	110265	7140		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0303	2.4834	0.1608		
	TOTAL MG			0.0400	3.2764	0.2122		
	% OF APPL	2.1322	0.0000	1.0629	87.1385	5.6425	3.1951	95.9760
58	DPM/ML			1750	114602	9625		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0394	2.5811	0.2168		
	TOTAL MG			0.0520	3.4053	0.2860		
	% OF APPL	2.2233	0.0000	1.3830	90.5658	7.6063	3.6063	101.7784
59	DPM/ML			3635	99145	14745		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0819	2.2330	0.3321		
	TOTAL MG			0.1080	2.9460	0.4381		
	% OF APPL	0.2435	0.0000	2.8726	78.3507	11.6524	3.1161	93.1193
60	DPM/ML			2955	102480	11045		
	VOL (ML)			50	50	50		
	TOTAL uCi			0.0666	2.3081	0.2488		
	TOTAL MG			0.0878	3.0451	0.3282		
	% OF APPL	(3.7604)	0.0000	2.3352	80.9862	8.7285		95.8103
MEAN % RECOVERY		1.2668	0.0000	1.3711	83.3520	8.2339	2.6645	95.0844
STND DEVIATION		0.9150	0.0000	0.9689	4.3299	1.8114	1.1262	3.9446

* Total 14C appearing in excreta plus that remaining on the skin surface at test end. Values in parentheses used only for accountability (TOTAL % RECOVERY). See Appendix C for explanation.

APPENDIX F

URINARY EXCRETION OF 14C IN RABBITS WEARING 14C-PERMETHRIN-TREATED NYCO FABRIC LAUNDERED 1X.

FABRIC: NYCO (50 cm2); LAUNDERED 1X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 3.17
PERMETHRIN CONTENT-mg 4.19
mg/uCi 1.3218

ANIMAL NO.		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	TOTAL
61	DPM/ML	60	84	0	52	46	45	39	
	URINE VOL	70	210	592	136	72	144	78	
	TOTAL uCi	0.0019	0.0079	0.0000	0.0032	0.0015	0.0029	0.0014	
	TOTAL MG	0.0025	0.0105	0.0000	0.0042	0.0020	0.0039	0.0018	
	% RECOVERY	0.0597	0.2507	0.0000	0.1005	0.0471	0.0921	0.0432	0.5932
62	DPM/ML	105	133	982 *	175 *	101	2087 *	807 *	
	URINE VOL	116	260	135	188	112	76	114	
	TOTAL uCi	0.0055	0.0156	0.0597	0.0148	0.0051	0.0714	0.0414	
	TOTAL MG	0.0073	0.0206	0.0789	0.0196	0.0067	0.0944	0.0548	
	% RECOVERY	0.1731	0.4914	1.8838	0.4675	0.1607	2.2538	1.3073	6.7376 *
63	DPM/ML	63	89	65	47	66	61	26	
	URINE VOL	146	176	160	135	74	110	92	
	TOTAL uCi	0.0041	0.0071	0.0047	0.0029	0.0022	0.0030	0.0011	
	TOTAL MG	0.0055	0.0093	0.0062	0.0038	0.0029	0.0040	0.0014	
	% RECOVERY	0.1307	0.2226	0.1478	0.0902	0.0694	0.0953	0.0340	0.7900
64	DPM/ML		117	87	71	0	52	40	
	URINE VOL	0	200	164	110	12	128	72	
	TOTAL uCi	0.0000	0.0105	0.0064	0.0035	0.0000	0.0030	0.0013	
	TOTAL MG	0.0000	0.0139	0.0085	0.0047	0.0000	0.0040	0.0017	
	% RECOVERY	0.0000	0.3325	0.2027	0.1110	0.0000	0.0946	0.0409	0.7817
65	DPM/ML	107	150	89	134	122	123	73	
	URINE VOL	318	180	212	150	140	124	170	
	TOTAL uCi	0.0153	0.0122	0.0085	0.0091	0.0077	0.0069	0.0056	
	TOTAL MG	0.0203	0.0161	0.0112	0.0120	0.0102	0.0091	0.0074	
	% RECOVERY	0.4835	0.3837	0.2681	0.2856	0.2427	0.2167	0.1763	2.0567
66	DPM/ML	83	105	56	64	58	67	188	
	URINE VOL	252	158	210	210	180	166	184	
	TOTAL uCi	0.0094	0.0075	0.0053	0.0061	0.0047	0.0050	0.0156	
	TOTAL MG	0.0125	0.0099	0.0070	0.0080	0.0062	0.0066	0.0206	
	% RECOVERY	0.2972	0.2357	0.1671	0.1910	0.1484	0.1580	0.4915	1.6890
MEAN % RECOVERY		0.1907	0.3194	0.1571	0.1556	0.1114	0.1314	0.0736	1.1821
STNDRD DEVIATION		0.1605	0.0957	0.0886	0.0741	0.0810	0.0494	0.0594	0.5801

* Value omitted in computation of MEAN % RECOVERY. Elevated value caused by animal ingesting a portion of the test swatch.

APPENDIX F

URINARY EXCRETION OF 14C IN RABBITS WEARING 14C-PERMETHRIN-TREATED NYCO FABRIC LAUNDERED 5X.

FABRIC: NYCO (50 cm2); LAUNDERED 5X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 2.51
PERMETHRIN CONTENT-mg 3.32
mg/uCi 1.3227

ANIMAL NO.		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	TOTAL
67	DPM/ML	82	126	94	123	116	115	77	
	URINE VOL	115	136	110	100	134	122	130	
	TOTAL uCi	0.0042	0.0077	0.0047	0.0055	0.0070	0.0063	0.0045	
	TOTAL MG	0.0056	0.0102	0.0062	0.0073	0.0093	0.0084	0.0060	
	% RECOVERY	0.1692	0.3075	0.1856	0.2207	0.2790	0.2518	0.1796	1.5934
68	DPM/ML	40	49	23	27	21	0	0	
	URINE VOL	342	328	328	270	258	188	216	
	TOTAL uCi	0.0062	0.0072	0.0034	0.0033	0.0024	0.0000	0.0000	
	TOTAL MG	0.0082	0.0096	0.0045	0.0043	0.0032	0.0000	0.0000	
	% RECOVERY	0.2455	0.2884	0.1354	0.1308	0.0972	0.0000	0.0000	0.8974
69	DPM/ML		285			642	0	442	
	URINE VOL	0	98	0	0	56	18	30	
	TOTAL uCi	0.0000	0.0126	0.0000	0.0000	0.0162	0.0000	0.0060	
	TOTAL MG	0.0000	0.0166	0.0000	0.0000	0.0214	0.0000	0.0079	
	% RECOVERY	0.0000	0.5012	0.0000	0.0000	0.6452	0.0000	0.2380	1.3844
70	DPM/ML	53	31	23	0	29	53	33	
	URINE VOL	140	360	622	300	400	190	166	
	TOTAL uCi	0.0033	0.0050	0.0064	0.0000	0.0052	0.0045	0.0025	
	TOTAL MG	0.0044	0.0066	0.0085	0.0000	0.0069	0.0060	0.0033	
	% RECOVERY	0.1332	0.2003	0.2567	0.0000	0.2082	0.1807	0.0983	1.0774
71	DPM/ML	51	54	60	123	304	89	128	
	URINE VOL	226	170	128	186	136	180	122	
	TOTAL uCi	0.0052	0.0041	0.0035	0.0103	0.0186	0.0072	0.0070	
	TOTAL MG	0.0069	0.0055	0.0046	0.0136	0.0246	0.0095	0.0093	
	% RECOVERY	0.2068	0.1647	0.1378	0.4106	0.7420	0.2875	0.2802	2.2297
72	DPM/ML	40	44	0	0	35	0	0	
	URINE VOL	174	145	116	148	122	38	94	
	TOTAL uCi	0.0031	0.0029	0.0000	0.0000	0.0019	0.0000	0.0000	
	TOTAL MG	0.0041	0.0038	0.0000	0.0000	0.0025	0.0000	0.0000	
	% RECOVERY	0.1249	0.1145	0.0000	0.0000	0.0766	0.0000	0.0000	0.3160
MEAN % RECOVERY		0.1466	0.2628	0.1193	0.1270	0.3414	0.1200	0.1327	1.2497
STNDRD DEVIATION		0.0775	0.1258	0.0934	0.1514	0.2595	0.1240	0.1091	0.5947

APPENDIX F

URINARY EXCRETION OF 14C IN RABBITS WEARING 14C-PERMETHRIN-TREATED NYCO FABRIC LAUNDERED 10X.

FABRIC: NYCO (50 cm2); LAUNDERED 10X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 2.13
PERMETHRIN CONTENT-mg 2.81
mg/uCi 1.3192

ANIMAL NO.		DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	TOTAL
73	DPM/ML	46	47	32	52	46	25	20	
	URINE VOL	76	90	162	150	92	138	176	
	TOTAL uCi	0.0016	0.0019	0.0023	0.0035	0.0019	0.0016	0.0016	
	TOTAL MG	0.0021	0.0025	0.0031	0.0046	0.0025	0.0021	0.0021	
	% RECOVERY	0.0739	0.0895	0.1096	0.1650	0.0895	0.0730	0.0744	0.6749
74	DPM/ML	34	30	30	44	33	57	76	
	URINE VOL	166	112	100	152	162	120	166	
	TOTAL uCi	0.0025	0.0015	0.0014	0.0030	0.0024	0.0031	0.0057	
	TOTAL MG	0.0034	0.0020	0.0018	0.0040	0.0032	0.0041	0.0075	
	% RECOVERY	0.1194	0.0711	0.0634	0.1414	0.1131	0.1447	0.2668	0.9198
75	DPM/ML	30	44	48	401 *	155 *	52	63	
	URINE VOL	210	100	84	184	206	138	192	
	TOTAL uCi	0.0028	0.0020	0.0018	0.0332	0.0144	0.0032	0.0054	
	TOTAL MG	0.0037	0.0026	0.0024	0.0438	0.0190	0.0043	0.0072	
	% RECOVERY	0.1332	0.0931	0.0853	1.5604	0.6753	0.1518	0.2558	2.9547 *
76	DPM/ML	45	58	35	312 *	173	28	40	
	URINE VOL	93	186	166	132	96	110	152	
	TOTAL uCi	0.0019	0.0049	0.0026	0.0186	0.0075	0.0014	0.0027	
	TOTAL MG	0.0025	0.0064	0.0035	0.0245	0.0099	0.0018	0.0036	
	% RECOVERY	0.0885	0.2281	0.1229	0.8710	0.3512	0.0651	0.1286	1.8554 *
77	DPM/ML	92	127	112	86	49	97	SAMPLE	
	URINE VOL	158	128	128	168	174	146	LOST	
	TOTAL uCi	0.0065	0.0073	0.0065	0.0065	0.0038	0.0064		
	TOTAL MG	0.0086	0.0097	0.0085	0.0086	0.0051	0.0084		
	% RECOVERY	0.3074	0.3438	0.3032	0.3055	0.1803	0.2995		1.7397
78	DPM/ML	64	100	301	57	70	36	43	
	URINE VOL	158	120	100	146	136	174	164	
	TOTAL uCi	0.0046	0.0054	0.0136	0.0037	0.0043	0.0028	0.0032	
	TOTAL MG	0.0060	0.0071	0.0179	0.0049	0.0057	0.0037	0.0042	
	% RECOVERY	0.2138	0.2538	0.6366	0.1760	0.2013	0.1325	0.1491	1.7631
MEAN % RECOVERY		0.1550	0.1799	0.2202	0.1970	0.1871	0.1444	0.1750	1.2744
STNDRD DEVIATION		0.0811	0.1018	0.2020	0.0639	0.0919	0.0771	0.0747	0.4849

* Value omitted in computation of MEAN % RECOVERY. Elevated value caused by animal ingesting a portion of the test swatch.

APPENDIX G

14C APPEARING IN RABBIT FECES THROUGH 7 DAYS FOLLOWING WEAR OF LAUNDERED NYCO FABRIC.

14C CONTENT IN 50 cm2 OF NYCO FABRIC (uCi):	4.73	PERMETHRIN CONTENT (mg):	6.25
AFTER LAUNDERING 1X:	3.17	AFTER LAUNDERING 1X:	4.19
AFTER LAUNDERING 5X:	2.51	AFTER LAUNDERING 5X:	3.32
AFTER LAUNDERING 10X:	2.13	AFTER LAUNDERING 10X:	2.81

GROUP	ANIMAL NO.	FECES GM-WGHT	WATER ADDED-GM	TOTAL WGHT	ALIQUOT GM	METHANOL ADDED-ML	DPM/ML	TOTAL uCi	TOTAL % RECOV
NYCO	61A	392	392	784	7	8	<LLD	0.0000	0.0000
WASH 1X	61B	494	494	988	6	8	<LLD	0.0000	0.0000
	62A	390	390	780	6	8	24.7	0.0116	0.3650
	62B	341	341	682	8	8	<LLD	0.0000	0.0000
	63A	499	499	998	8	8	<LLD	0.0000	0.0000
	63B	411	411	822	6	8	<LLD	0.0000	0.0000
	64A	251	251	502	4	8	<LLD	0.0000	0.0000
	64B	367	367	734	8	8	<LLD	0.0000	0.0000
	65A	384	384	768	10	8	<LLD	0.0000	0.0000
	65B	396	396	792	7	8	<LLD	0.0000	0.0000
	66A	418	418	836	9	8	<LLD	0.0000	0.0000
	66B	488	488	976	8	8	<LLD	0.0000	0.0000
NYCO	67A	406	406	812	11	8	<LLD	0.0000	0.0000
WASH 5X	67B	367	367	734	9	8	<LLD	0.0000	0.0000
	68A	395	395	790	11	8	<LLD	0.0000	0.0000
	68B	383	383	766	6	8	<LLD	0.0000	0.0000
	69A	7	7	14	6	8	<LLD	0.0000	0.0000
	69B	0	0	0	0	8	<LLD	0.0000	0.0000
	70A	357	357	714	10	8	<LLD	0.0000	0.0000
	70B	429	429	858	7	8	<LLD	0.0000	0.0000
	71A	484	484	968	7	10	<LLD	0.0000	0.0000
	71B	404	404	808	9	10	<LLD	0.0000	0.0000
	72A	327	327	654	8	10	<LLD	0.0000	0.0000
	72B	225	225	450	9	10	<LLD	0.0000	0.0000
NYCO	73A	332	332	664	9	10	<LLD	0.0000	0.0000
WASH 10X	73B	324	324	648	7	10	<LLD	0.0000	0.0000
	74A	508	508	1016	10	10	<LLD	0.0000	0.0000
	74B	402	402	804	9	10	<LLD	0.0000	0.0000
	75A	349	349	698	8	10	<LLD	0.0000	0.0000
	75B	196	196	392	7	10	<LLD	0.0000	0.0000
	76A	298	298	596	9	10	<LLD	0.0000	0.0000
	76B	192	192	384	10	10	<LLD	0.0000	0.0000
	77A	441	441	882	8	10	<LLD	0.0000	0.0000
	77B	475	475	950	8	10	<LLD	0.0000	0.0000
	78A	558	558	1116	10	10	<LLD	0.0000	0.0000
	78B	502	502	1004	8	10	<LLD	0.0000	0.0000

Feces volumes were divided for analysis, hence, the A and B designation.
<LLD - Equal to or less than the Lower Limit of Detectability.

APPENDIX H

TOTAL 14C RECOVERY IN RABBITS WEARING 14C-PERMETHRIN-TREATED NYCO FABRIC LAUNDERED 1X.

FABRIC: NYCO (50 cm2 SWATCH); LAUNDERED 1X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 3.17
PERMETHRIN CONTENT-mg 4.19
mg/uCi 1.3218

ANIMAL NO.		URINE	FECES	SKIN-APP SITE	TEST FABRIC	BINDINGS	% MIGRA TO SKIN*	TOTAL % RECOVERY
61	DPM/ML			2779	118024	10369		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0626	2.6582	0.4671		
	TOTAL MG			0.0827	3.5136	0.6174		
	% OF APPL	0.5932	0.0000	1.9745	83.8548	14.7341	2.5677	101.1566
62	DPM/ML			1187	120019	5489		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0267	2.7031	0.2473		
	TOTAL MG			0.0353	3.5730	0.3268		
	% OF APPL	(6.7376)	0.3650	0.8434	85.2723	7.7998		101.0180
63	DPM/ML			3709	107384	11599		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0835	2.4186	0.5225		
	TOTAL MG			0.1104	3.1969	0.6906		
	% OF APPL	0.7900	0.0000	2.6352	76.2952	16.4819	3.4252	96.2024
64	DPM/ML			5194	108854	9829		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.1170	2.4517	0.4427		
	TOTAL MG			0.1546	3.2406	0.5852		
	% OF APPL	0.7817	0.0000	3.6903	77.3396	13.9668	4.4720	95.7784
65	DPM/ML			1114	114134	10529		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0251	2.5706	0.4743		
	TOTAL MG			0.0332	3.3978	0.6269		
	% OF APPL	2.0567	0.0000	0.7915	81.0910	14.9615	2.8482	98.9007
66	DPM/ML			1474	122194	5994		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0332	2.7521	0.2700		
	TOTAL MG			0.0439	3.6377	0.3569		
	% OF APPL	1.6890	0.0000	1.0473	86.8176	8.5174	2.7363	98.0712
MEAN % RECOVERY		1.1821	0.0608	1.8303	81.7784	12.7436	3.2099	98.5212
STND DEVIATION		0.5801	0.1360	1.0642	3.9190	3.3331	0.6938	2.0986

* Total 14C appearing in excreta plus that remaining on the skin surface at test end. Values in parentheses used only for accountability (TOTAL % RECOVERY). See Appendix F for explanation.

APPENDIX H

TOTAL 14C RECOVERY IN RABBITS WEARING 14C-PERMETHRIN-TREATED FABRIC LAUNDERED 5X.

FABRIC: NYCO (50 cm2 SWATCH); LAUNDERED 5X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 2.51
PERMETHRIN CONTENT-mg 3.32
mg/uCi 1.3227

ANIMAL NO.		URINE	FECES	SKIN-APP SITE	TEST FABRIC	BINDINGS	% MIGRA TO SKIN*	TOTAL % RECOVERY
67	DPM/ML			1657	90099	6303		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0373	2.0293	0.2839		
	TOTAL MG			0.0494	2.6841	0.3755		
	% OF APPL	1.5934	0.0000	1.4868	80.8469	11.3115	3.0802	95.2386
68	DPM/ML			3151	92229	7048		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0710	2.0772	0.3175		
	TOTAL MG			0.0939	2.7476	0.4199		
	% OF APPL	0.8974	0.0000	2.8274	82.7582	12.6485	3.7248	99.1315
69	DPM/ML			5359	96719	4709		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.1207	2.1784	0.2121		
	TOTAL MG			0.1596	2.8813	0.2806		
	% OF APPL	1.3854	0.0000	4.8087	86.7871	8.4509	6.1941	101.4321
70	DPM/ML			5444	99904	4424		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.1226	2.2501	0.1993		
	TOTAL MG			0.1622	2.9762	0.2636		
	% OF APPL	1.0774	0.0000	4.8850	89.6450	7.9394	5.9624	103.5468
71	DPM/ML			1764	94129	2989		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0397	2.1200	0.1346		
	TOTAL MG			0.0526	2.8042	0.1781		
	% OF APPL	2.2297	0.0000	1.5829	84.4630	5.3641	3.8126	93.6397
72	DPM/ML			3829	87749	6359		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0862	1.9763	0.2864		
	TOTAL MG			0.1141	2.6141	0.3789		
	% OF APPL	0.3160	0.0000	3.4358	78.7382	11.4120	3.7518	93.9020
MEAN % RECOVERY		1.2499	0.0000	3.1711	83.8731	9.5211	4.4210	97.8151
STND DEVIATION		0.5948	0.0000	1.3642	3.6268	2.4996	1.1986	3.8090

* Total 14C appearing in excreta plus that remaining on the skin surface at test end. Values in parentheses used only for accountability (TOTAL % RECOVERY). See Appendix F for explanation.

APPENDIX H

TOTAL 14C RECOVERY IN RABBITS WEARING 14C-PERMETHRIN-TREATED NYCO FABRIC LAUNDERED 10X.

FABRIC: NYCO (50 cm2 SWATCH); LAUNDERED 10X
ENVIRONMENTAL CONDITIONS: TEMPERATE
TEST LENGTH: 7 DAYS

RADIOCARBON CONTENT-uCi 2.13
PERMETHRIN CONTENT-mg 2.81
mg/uCi 1.3192

ANIMAL NO.		URINE	FECES	SKIN-APP SITE	TEST FABRIC	BINDINGS	% MIGRA TO SKIN*	TOTAL % RECOVERY
73	DPM/ML			2470	87414	3074		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0556	1.9688	0.1385		
	TOTAL MG			0.0734	2.5972	0.1827		
	% OF APPL	0.6749	0.0000	2.6118	92.4312	6.5009	3.2867	102.2187
74	DPM/ML			3689	77514	3569		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0831	1.7458	0.1608		
	TOTAL MG			0.1096	2.3031	0.2121		
	% OF APPL	0.9198	0.0000	3.9007	81.9629	7.5477	4.8205	94.3312
75	DPM/ML			989	76694	1459		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0223	1.7273	0.0657		
	TOTAL MG			0.0294	2.2787	0.0867		
	% OF APPL	(2.9547)	0.0000	1.0458	81.0959	3.0855		88.1818
76	DPM/ML			1634	73759	3359		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0368	1.6612	0.1513		
	TOTAL MG			0.0485	2.1915	0.1996		
	% OF APPL	(1.8554)	0.0000	1.7278	77.9924	7.1036		88.6792
77	DPM/ML			904	101084	2854		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0204	2.2767	0.1286		
	TOTAL MG			0.0269	3.0034	0.1696		
	% OF APPL	1.7397	0.0000	0.9559	106.8858	6.0356	2.6956	115.6170
78	DPM/ML			1609	83419	3689		
	VOL (ML)			50	50	100		
	TOTAL uCi			0.0362	1.8788	0.1662		
	TOTAL MG			0.0478	2.4785	0.2192		
	% OF APPL	1.7631	0.0000	1.7013	88.2069	7.8015	3.4644	99.4728
MEAN % RECOVERY		1.2744	0.0000	1.9905	88.0958	6.3458	2.3779	98.0834
STND DEVIATION		0.4849	0.0000	1.0125	9.6657	1.5752	1.7973	9.3721

* Total 14C appearing in excrete plus that remaining on the skin surface at test end. Values in parentheses used only for accountability (TOTAL % RECOVERY). See Appendix F for explanation.